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William F. Caton
Acting Secretary
Federal Communications Commission
445 – 12th Street. S.W.
Washington, D. C. 20554

Re: FCC Docket 98-153; Revision of Part 15 of the Commission's Rules regarding
Ultra-Wideband Transmission Systems **-Ex Parte Communication**

Dear Mr. Caton :

Lucent Technologies Inc. (Lucent) offers the Commission the following additional information concerning possible interference from UWB devices into existing wireless services. Lucent previously filed comments (September 12, 2000) and replies (October 27, 2000) in this Proceeding. In those filings, Lucent was primarily concerned with interference from UWB devices into Local Area Networks (802.11), but suggested that its findings should be applicable to other high bandwidth systems that may be affected by UWB interference. The filings also discussed measurement procedures and specifically proposed a measurement method to assess compliance with the suggested limits. Lucent's analysis calculated the distances required between the interfering UWB system and the victim 802.11 network, and concluded that interference free operation demanded a separation of from 4 to 27 meters, depending on the type of UWB operation (burst or non-burst) and the specific type 802.11 network. Importantly, Lucent supported the Commission's proposed emissions requirements, which adopted the limits in Section 15.209 of the Commission's Rules, with the Commission's added constraint the emissions below 2 GHz be attenuated by an additional 12 dB. Moreover, Lucent suggested that the additional 12 dB requirement be extended to spectrum below 3 GHz in consideration of CMRS (e.g. PCS systems) with specific reference to the then expected (and now realized) deployment of third generation wireless (3G).

Since that time, Lucent has noted with interest the studies submitted in this Proceeding which detail the potential interference from UWB devices into CMRS. Lucent believes the conclusions developed by the Sprint/Time Domain/Telecordia test and analysis that suggest UWB can adversely impact the capacity and blocking performance of CDMA systems are correct. Further, Lucent concurs with the finding -- based upon the study assumptions -- that the additional 12 dB proposed by the Commission may not be sufficient to eliminate the potential for damaging interference.

Lucent has also reviewed the recently submitted analysis from Qualcomm, which identifies the potential for interference from UWB devices into a handset based GPS

receiver, a key component of Qualcomm's solution to provide compliance with the Commission's Phase II E 9-1-1 location requirement. The Qualcomm study shows that UWB interference can impact the ability of the receiver to acquire the GPS satellites and could, therefore, consequently generate positioning errors.

This is significant to Lucent because, as the Commission may know, GPS is also a key component of CDMA base station technology and is used to provide timing information that is essential for required synchronization. It is therefore possible that interference generated from UWB devices could similarly impact the GPS receivers associated with base stations. This potential is enhanced because the GPS antenna is typically not located on top of the antenna tower, physically distant from ground based sources of interference. Rather, it is most often affixed to the top or perhaps side of the equipment building or sometimes located on the tower, but at a much lower height than the antenna array used for reception of signals from mobile terminals. Lucent has performed a brief preliminary analysis (as described below) to determine if concerns are indeed warranted.

Consider a scenario in which emission power of a UWB device falling into the GPS carrier band is -41 dBm/MHz, compliant with the Commission's Part 15 (Section 15.209) emission requirements at a distance of 3 meters. Assume also that the GPS antenna provides 20 dB attenuation to a ground-based source of interference due to the antenna pattern and orientation. Because the allowable in-band "jamming" signal level of the GPS receiver is -105 dBm, the required isolation between the UWB transmitter and the victim GPS receiver should be at least 44 dB to prevent the UWB interference. The Commission's proposal to reduce the allowable UWB emission power in frequencies below 2 GHz by 12 dB would reduce the required isolation to 32 dB. This level of isolation can be translated into a required separation of 120 meters if the free space propagation loss (with a slope of 20 dB/decade) is applied to the RF environment. It may be difficult to achieve this level of separation in real applications, especially in dense urban areas where there is a higher probability of the use of large numbers of UWB devices. The situation within such urban areas may be further aggravated by the frequent use of the CDMA microcell, which has a small cell radius and can have lower mounted antennas.

Finally, it should be recognized that the above analysis considers only a single source of UWB interference. The Commission in its NPRM, and subsequently the record in the Proceeding, has identified the issue of multiple UWB sources and the potential for increased levels of interference. That is, the presence of multiple interferers could effectively raise the level of UWB emissions and increase the probability of adverse impact on the operation of GPS receivers.

It is, therefore, acknowledged that refinement of this analysis might be beneficial. Specifically, the inclusion of parameters such as the number of interferers and the duration of the interference present could provide additional insight. It is further recognized that the base station contains an internal oscillator designed as a backup to GPS-based timing, and should, therefore, permit the continued operation of the cell site for some time if the GPS receiver is unable to acquire the GPS signal. It is significant to note, however, the acquisition of the GPS signal is not an instantaneous process, and that it can take considerable time to generate a stable timing signal for use in the base station. A burst of interference could interrupt this process and further extend the required time. It would appear reasonable, therefore, that measures be considered to mitigate this potential interference problem. Such measures could include the

requirement for additional attenuation of UWB emissions below a given frequency (i.e., 2 or 3 GHz) – beyond the 12 dB already proposed by the Commission. |

Lucent appreciates the potential for UWB applications such as ground penetrating radar and other imaging applications, along with its use in short range communications systems. However, the potential for interference from UWB into existing wireless systems demands that the Commission proceed cautiously as it considers rules for UWB deployment.

Thank you for your consideration in this matter.

Sincerely,

Gena L. Ashe
Corporate Counsel
Lucent Technologies Inc.